

KAOS

For People Who Have Got Smart

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 FORTH DAVID WILSON
 AMATEUR RADIO . ROD DRYSDALE VK3BYU
 EDUCATION NOEL DOLLMAN
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 SECRETARY ROSEMARY EYLES

OSI	SYM	KIM	AIM	APPLE	UK101	ORANGE
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Vol.3 No.2

November 1982

Well, it's that time of year again, membership renewals are due in January. You will find a form enclosed in this newsletter, would you please fill in the details to enable us to keep our records up to date. If you have already paid your membership for 1983, please do not send us more money, just return the completed form.

We don't want to go into a long sad story, but as everyone knows, costs have risen at an alarming rate during the last year, so, regretfully we have had to increase the membership fee to \$15.00 for Australia, \$20.00 for New Zealand and Papua New Guinea, and \$25.00 for the rest of the world. Tasmania is classed as part of Australia.

George from COMP-SOFT has PROMISED us a demonstration of the new Assembler at the November meeting and Ray Gardiner and Bill Chilcott are pretty confident that the new Rabble 65 computer will be operating, so they can show us what their new baby can do.

As usual, there will be no December meeting as some people have the strange idea that they should be with their families at Christmas, and not playing with computers, however there will be a December newsletter. See the paragraph below about the early deadline.

The next meeting will be on Sunday 28th November 1982 at 2pm at the Essendon Primary School, which is on the corner of Raleigh and Nicholson Streets, Essendon. Would the usual early arrivers please note that the children will be there at 10.30am.

As the printer is closing early for Christmas, the deadline for items for the December newsletter will be one week earlier than usual. December 3th is the last possible date that we will accept items for publication. To our regular contributors, we apologize for any inconvenience this may cause.

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EDUCATIONAL SOFTWARE LIBRARY

by Noel Dollman

I am setting about the task of reviewing and cataloging the Educational software in the club's possession. This month I managed to look at 3 groups of programs, all of which, with one exception, I found to be pretty unimpressive. Anyway, for what it's worth, here they are:-

1. MATRIX TUTOR SERIES (by Placeh & Dull)

MATRIX I deals with addition of matrices (but ignores subtraction), multiplication of a matrix by a scalar and multiplication of 2X2 matrices. The material is pitched at about Y10-11 standard.

MATRIX II covers the concept of identity, finding the inverse of 2X2 matrices by row reduction method, determinants of 2X2 matrices and confactors, level Y11-12.

MATRIX III covers determinants, transpose, adjoint and inverse of MxN matrices, level Y12.

COMMENTS: All these programs do is present the material in much the same way as it would be dealt with in a book. In my opinion you would be much better off with a decent book on the subject as screens full of text are about the best "turn-off" you could imagine. There is no attempt to use the special attributes of computers, such as animated graphics or random generation of questions etc., instead the presentation is deadly dull, the exercises limited and, at the end, if you elect to review the work, you get the whole boring mess again.

2. LOG TUTOR SERIES (by Placeh & Dull)

LOG I This covers the definitions of logarithmic and exponential function, the logarithm laws and common and natural logarithms at about Y11 level.

LOGS II & III are quizzes on the material covered in LOGS I.

COMMENTS: Just as bad as the MATRIX series.

3. ALGEBRA SERIES (by Doug Palmer)

ALGEBRA I covers factorization and expansion of linear expression and linear equation solving, Y10 level.

ALGEBRA II generates random exercises for the topics covered in Algebra I.

COMMENT: Once again the lesson part of the material (Algebra I) was presented in a very dull and unimaginative way, lots of words, no graphics etc., so that a reasonable text book would do the job infinitely better. Algebra II, however employs some very cunning use of RND function to generate problems and would be quite useful for kids who need to do lots of questions before the message penetrates. The presentation isn't that good, but ok and the program needs a method of getting a random seed for the RND function so that you don't get the same series of problems each time you run it. At the conclusion of a set of questions, the program gives the total score and a breakdown of scores in each of three categories (factorization, expansion, equation solving).

4. MATH LIBRARY (by Bryan Ungard)

This program calculates tutorials, prime factors, least common multiples, roots of quadratic functions, pythagoreum triples, distance between two points on a plane, slope and midpoint of a line joining two points on a plane, and values of trigonometric functions.

COMMENT: If you needed a calculator with all these special functions, then this program would be fine.

THE DATA PROFESSIONALS of 172 Edward St, Brisbane 4000. ph.(07)229 7101 have the following machines for sale at bargain prices as they are no longer dealers for OSI.

2 X C4P at \$650.00 each

2 X C4P-MF at \$1250.00 each

1 X C3-OEM at \$6500.00 (includes option update to 56K, CP/M, COBOL, FORTRAN, C10 Board, RS232 Port, OS 65U, OS 65D, Multi DMS Nucleus, G/L, A/R, A/P, Inventory.)

DISK EXT MON FORMATTED OUTPUT

by Frank Halley

This program is an extension to the EM for a formatted disassembly. Although you can disassemble to the printer with the "Q" command after setting the output flags, the listing appears on the very left of the paper, and output stops every 20 or so lines for you to press 'Linefeed' before continuing. With this extension, using the unused "Z" command (or J or U), the listing is spaced out across the paper, and you specify the start/stop addresses.

I have added it at \$1F40, but if you already have some extensions, such as Rodney Eisfelder's search routine from newsletter 2/12, it could be put after them and its address inserted in the lookup table at \$18D3,4 (if using "Z"). Location \$1F54 controls the spacing across the page. I often disassemble pages of code, then put in notes as I figure out parts of it. The spacing gives extra room for comments, labels, etc.

'Z' Command for Ext Mon (Disk System)

:Z1F40,1F83

1F40 206B1A	JSR \$1A6B
1F43 A903	LDA #\$03
1F45 8D2223	STA \$2322
1F48 A5CC	LDA \$CC
1F4A 85C5	STA \$C5
1F4C A5CD	LDA \$CD
1F4E 85C6	STA \$C6
1F50 20561A	JSR \$1A56
1F53 A20A	LDX #\$0A
1F55 8E5019	STX \$1950
1F58 CA	DEX
1F5C D0FA	BNE \$1F58
1F5E 20BF19	JSR \$19BF
1F61 20F018	JSR \$18F0
1F64 20D119	JSR \$19D1
1F67 85C5	STA \$C5
1F69 84C6	STY \$C6
1F6B 38	SEC
1F6C A5CE	LDA \$CE
1F6E E5C5	SBC \$C5
1F70 A5CF	LDA \$CF
1F72 E5C6	SBC \$C6
1F74 B0DA	BCS \$1F50
1F76 20561A	JSR \$1A56
1F79 A902	LDA #\$02
1F7B 8D2223	STA \$2322
1F7E A904	LDA \$04
1F80 8D5019	STA \$1950
1F83 60	RTS

EM Command Look-up Table

:D1890,18D9

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
1890	08	9B	44	64	80	16	40	10	6A	6F	2E	7E	9C	48	56	A2
18A0	1A	0A	1B	05	1C	2A	1C	3D	1C	B5	1B	09	1D	17	1B	99
18B0	1D	70	1B	96	17	06	1B	AC	1E	F7	1C	9E	1C	8F	1D	07
18C0	1B	7F	1C	1D	1D	29	1E	D9	1B	96	17	A3	1E	E7	1C	09
18D0	1B	08	1B	40	1F	25	1B	4D	17							

Address of 'Z' command routine

Superboard

NEWSLETTER OF THE OHIO SUPERBOARD USER GROUP, 146 YORK STREET, NUNDAH, 4012.

I am unable to bring you the promised article on the fast access cartridge system this month. Next month for sure!

ARSIN & ARCOS FUNCTIONS by Chris Wyatt.

```
1000 DEF FNA(X)=ATN(SQR((1-X*X)/(X*X))):REM ARCOS
1010 DEF FNB(X)=ATN(1/SQR((1-X*X)/(X*X))):REM ARSIN
1020 DEF FNC(X)=X*57.2958:REM RADIANS TO DECIMAL DEGREES
1030 DEF FND(X)=X*1.74533E-1:REM DECIMAL DEGREES TO RADIANS
1040 DEF FNE(X)=(X-INT(X))*60:REM DECIMAL DEGREES TO DEG,MIN,SEC
1050 DEF FNF(X)=X/60:REM DEG,MIN,SEC TO DECIMAL DEGREES
```

Functions E and F can also be used on Hrs, mins and seconds. The following program demonstrates the use and accuracy of the functions. Because ATN is used to obtain arsin and arcos, a check for the right quadrant must be made. In this case it is fairly simple. If used in more complicated programs, a check of all cases for right quadrant of the angle will have to be made. When using the functions in other programs, they must be placed at the start of the program or an undefined function error will occur.

```
2000 INPUT"DEG,MIN & SECS";D,M,S
2010 DD=D+FNF(M)+FNF(FNF(S)):RD=FND(DD):SD=SIN(RD):CD=COS(RD)
2020 R1=FNB(SD):R1=FNC(R1):R2=FNA(CD):R2=FNC(R2)
2030 D1=INT(R1):M1=INT(FNE(R1)):S1=INT(FNE(FNE(R1)))
2040 D2=INT(R2):M2=INT(FNE(R2)):S2=INT(FNE(FNE(R2)))
2050 GOSUB 3000:REM CHECK FOR RIGHT QUADRANT
2060 PRINT"ORIGINAL";D;M;S:PRINT"ARSIN ";D1;M1;S1
2070 PRINT"ARCOS ";D2;M2;S2:END
3000 IF D>0 AND D<91 THEN RETURN
3010 IF D>90 AND D<181 THEN D1=D1+90:D2=D2+90:RETURN
3020 IF D>180 AND D<271 THEN D1=D1+180:D2=D2+180:RETURN
3030 D1=D1+270:D2=D2+270:RETURN
```

SOFTWARE REVIEW - Trend Line.

Trend line is an OSI program, written in Basic by David Tewksbary. The program calculates the slope of the straight line that is the best fit to user specified points. This is accomplished by a least squares analysis. A graph of the points entered by the user is then plotted, and X and Y values of any point on the graph can be obtained.

On a test, the program proved to be quite accurate. I would imagine the uses of Trend Line would be limited indeed.

Trend Line is in the OSUG Library at 27¢ + 40¢ stamps for library members to try.

FEBRUARY COMPETITION

Once each year, the Ohio Superboard User Group runs a programming competition for members. Programs can be on any subject and the only limits are that they must run in 8K memory and suit the standard 24 x 24 format of the Superboard. This year we will have two categories:- (A) Practical

(B) Entertaining

As the heading suggests, next year the competition will be run in February. There will be three prizes in each category if we have enough entries. More details next month.

Superboard

Software Review - GALAXIA

Galaxia is an arcade game in M/C occupying from \$0250 - \$0CD5. The tape comes as Dual Galaxia, with a C4P version on the back.

A squad of space ships hover above your mobile missile launcher, and raiding parties peel off and attack with bombs. Your aim is to dodge the bombs and destroy the attackers and squad. Once this task is accomplished, a new squad appears and the battle is on once again. Your score is continually updated, and you go on evading bombs and blasting galaxians until you have lost three launchers. At this point, you are invited to play again.

Once you have mastered the art of dodging, the game becomes easier. If you have done the 2MHz conversion, this will pep it up somewhat.

The C4P version was faulty, and it appears other buyers have had similar problems. Bert Patterson has figured out this correction:-

\$0CB0 9D 06 D3 E8 E0 18 D0 EF 20 00 FD C9 35 D0 F9 4C 50 02. Start is \$0250.

The program is available from Aardvark (see Oct. SUPERBOARD for address).

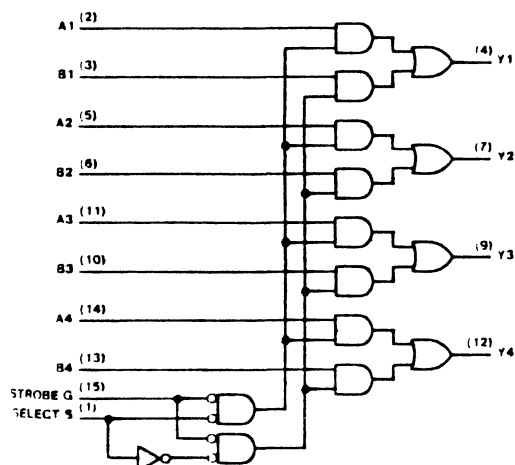
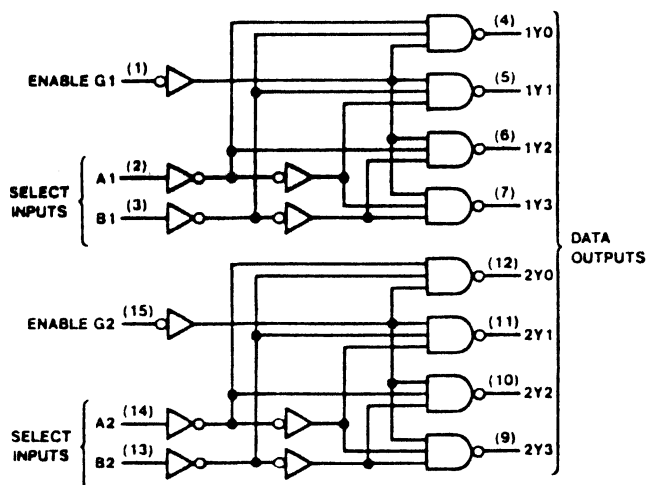
Library members can try it first by sending one 27¢ and one 40¢ stamp.

CONGRATULATIONS

Congratulations are in order for Paul Brodie who recently won a free membership to The Australian Beginning by entering a competition run by Electronics Aust. magazine a couple of months ago.

WHAT'S IN THAT CHIP - 74LS139 - LS157

The LS139 and LS157 are both used in the Superboard decoding. The LS139 consists of two separate two to four line decoders in the one package. The LS157 selects a four bit word from one of two sources and sends it to the outputs.



74LS139: Delay 21ns Power 34mW

74LS157: Delay 9ns Power 50mW

Should you ever need to replace a LS157 and are offered a L157 or a 157, always choose the 74157. The similar propagation delay is of much greater significance than the extra power that the chip will require.

Ed Richardson.

BOOKS FOR 6502 ASSEMBLER PROGRAMMING
B.C. Freasier

Sooner or later most 6502 computer hobbyists will find the interpretive BASIC which they have initially used in their programming activities will not be able to perform a desired task. This situation will usually arise because the task requires greater speed or less memory than interpretive BASIC allows. The desired speed increase can often be realized by using some type of high level compiler (PASCAL, BASIC, etc.) or a more efficient interpreter (FORTH, e.g.). The memory overhead is often so high as to be lethal for a small (say 8K) system.

The alternative is to use machine code. The programmer can use the computer's monitor to enter hand assembled machine code, but this procedure is a satisfactory solution for only the most masochistic of programmers. Most of us will end up using an assembler. Unless you are fortunate enough to work or live in close proximity to an expert assembler programmer the chances are that you will have to learn how to program 6502 machine code from a book. The purpose of this note is to briefly review a few books on programming the 6502 processor to help you make a choice of tutorial material.

How to Program Microcomputers. William Barden.

This book is often distributed by OSI with their multiprocessor C3 as it covers all of the micros used in that machine. I found it a good book although necessarily limited in scope by the length of the book and having to cover all three processors. It has a very good appendix where useful routines are replicated for each processor. It certainly gives an excellent indication of which micro is good for different functions. It is a very good introductory text on micros but not with special emphasis on the 6502.

6502 Assembly Language Programming. Lance Leventhal.

This is a very fine book which is probably the most complete book available for the 6502. The trouble is usually in finding what you are looking for. There is no index so the reader must refer to the table of contents. It follows the Osborne books' useful practice of emphasizing the most important points. The book has some nice problem sets which test the reader's understanding of the material. Leventhal covers the common peripheral interface chips very well. The book is aimed at the first or second year University student.

Programming the 6502. Rodney Zaks.

I found this book to be full of errors and vague statements, many of which could be extremely confusing if the reader was not already familiar with the subject. It seemed to me that the material in the book was not organized well enough to serve as a useful reference.

6502 Software Design. Leo J. Scanlon.

This book was written as a 6502 primer for AIM65 users by Rockwell. Scanlon is a professional technical writer, and it is apparent in this book. This book is my personal favourite and is particularly well suited to the user who has at least a casual acquaintance with machine code programming. I have found it to be remarkable error free. Scanlon has a clear terse style. On a given topic practically every sentence is aimed towards increasing understanding and, in fact, can be vital to achieving that goal. In other words, if this was an Osborne book, most of it would be in bold face. All topics treated are done very competently. Although the book has no exercises, there are numerous examples. It is probably not best suited for a programmer who has never done machine coding of any kind.

Beyond Games: Systems Software for Your 6502 Personal Computer. Ken Skiier.

This book is written with a loose easy-going style and gives a very good introduction to assembler coding to beginners by explaining how to program a monitor for a 6502 machine. He first developed this monitor for a ClP, so a lot of our membership could well be interested in how he writes his version of an extended monitor. Unfortunately, the number of topics that he covers by restricting his examples to his monitor is limited compared to some of the other books reviewed. He does do a good job of explaining his monitor however.

Programming and Interfacing the 6502. M. de Jong.

This book is aimed at people who need to write machine code to interface peripheral devices. The ideas covered are quite sound, and the projects used as examples are generally interesting. Unfortunately, he often uses routines from the KIM board series without explaining their function. So unless the user is very familiar with both the KIM and his equipment, it could very well be difficult to use (sometimes even understand) the routines given in this book.

6502 Software Gourmet Guide and Cookbook. Robert Findley.

This book contains a number of useful routines which can be transcribed essentially without change into the user's program. Findley has a good discussion of the algorithms for floating point arithmetic and includes the routines to do them. If you are going to do floating point operations in machine code and do not know how, this is the book for you.

6502 Assembly Language Subroutines. Lance Leventhal & Winthrop Saville.

This is the best documented set of cookbook routines that I have seen for the 6502. The routines are well chosen and cover everything from multiple precision arithmetic operations to I/O handlers. These routines have clearly been written by experienced assembler programmers. In addition, the authors discuss in detail good programming methods for the 6502 including common programming pitfalls.

In summary, if you are a rank beginner at machine code, I recommend Skiier's book. If you have had some experience Leventhal and Scanlon are quite good. For cookbook routines, the books of choice are by Saville, Findley and Barden in that order. If you must own only one book, I would recommend Scanlon. If you are able to afford two books, I think that you would do quite well with Leventhal plus Leventhal and Saville.

```
10 PRINT"HERE IS A BASIC TRACE ROUTINE FOR THE SUPERBOARD THAT
20 PRINT"POKES THE LINE NUMBER AT THE BOTTOM OF THE SCREEN.
30 PRINT"TO STOP THE PROGRAM PRESS REPEAT.
40 PRINT"THIS CAN BE HELD DOWN WHILE INPUT STATEMENTS
50 PRINT"ARE BEING DEALT WITH WITHOUT ALTERING THE DATA.
60 PRINT"TO SLOW DOWN THE BASIC PROGRAM PRESS RIGHT SHIFT,
70 PRINT"LEFT SHIFT, ESC OR CTRL.
80 PRINT"TO SINGLE STEP HOLD DOWN CTRL AND PULSE REPEAT.
90 PRINT"                JOHN WHITEHEAD
100 :
30000 PRINVCCHR$(127)"BASIC TRACE J121082W
30005 REM From 546 to 650
30010 DATA 169, 45, 141, 28, 2, 169, 2, 141, 29, 2, 96, 165, 136, 201
30020 DATA 255, 240, 84, 133, 173, 166, 135, 134, 174, 162, 144, 56
30030 DATA 32, 232, 183, 169, 91, 141, 231, 211, 169, 93, 141, 237
30040 DATA 211, 32, 110, 185, 162, 0, 189, 1, 1, 240, 10, 157, 232
30050 DATA 211, 232, 224, 5, 240, 12, 208, 241, 169, 32, 157, 232
30060 DATA 211, 232, 224, 5, 208, 248, 169, 254, 141, 0, 223, 173
30070 DATA 0, 223, 73, 255, 201,2,144,18, 201,80,176,238, 141, 138, 2
30080 DATA 162, 0, 32, 128, 254, 232, 236, 138, 2, 208, 247, 76, 155
30090 DATA 255, 255
30100 FORC=0 TO 104 :READ I:POKE 546 +C,I:NEXT
30110 POKE11,34:POKE12,2:X=USR(X)
```

THE 16 PIN I/O BUSS CONNECTOR

by David Anear

OSI C4 MF and C8P DF computers have a 16 pin I/O connector for adding extra peripherals. Very few OSI owners know anything about it, and fewer still have ever used it, however it is a brilliant concept which allows you to connect 4 PIAs or 8 ACIAs to your computer via a single 16 pin cable. This allows you to connect a special function PIA etc to the system with a low cost connector and has the added advantage that very little decode overhead is required. You are not limited to PIAs and ACIAs for this buss as it appears in the OSI memory map at locations \$C700 to \$C70F giving you 16 locations to fit what you like eg. a VIA takes 16 locations.

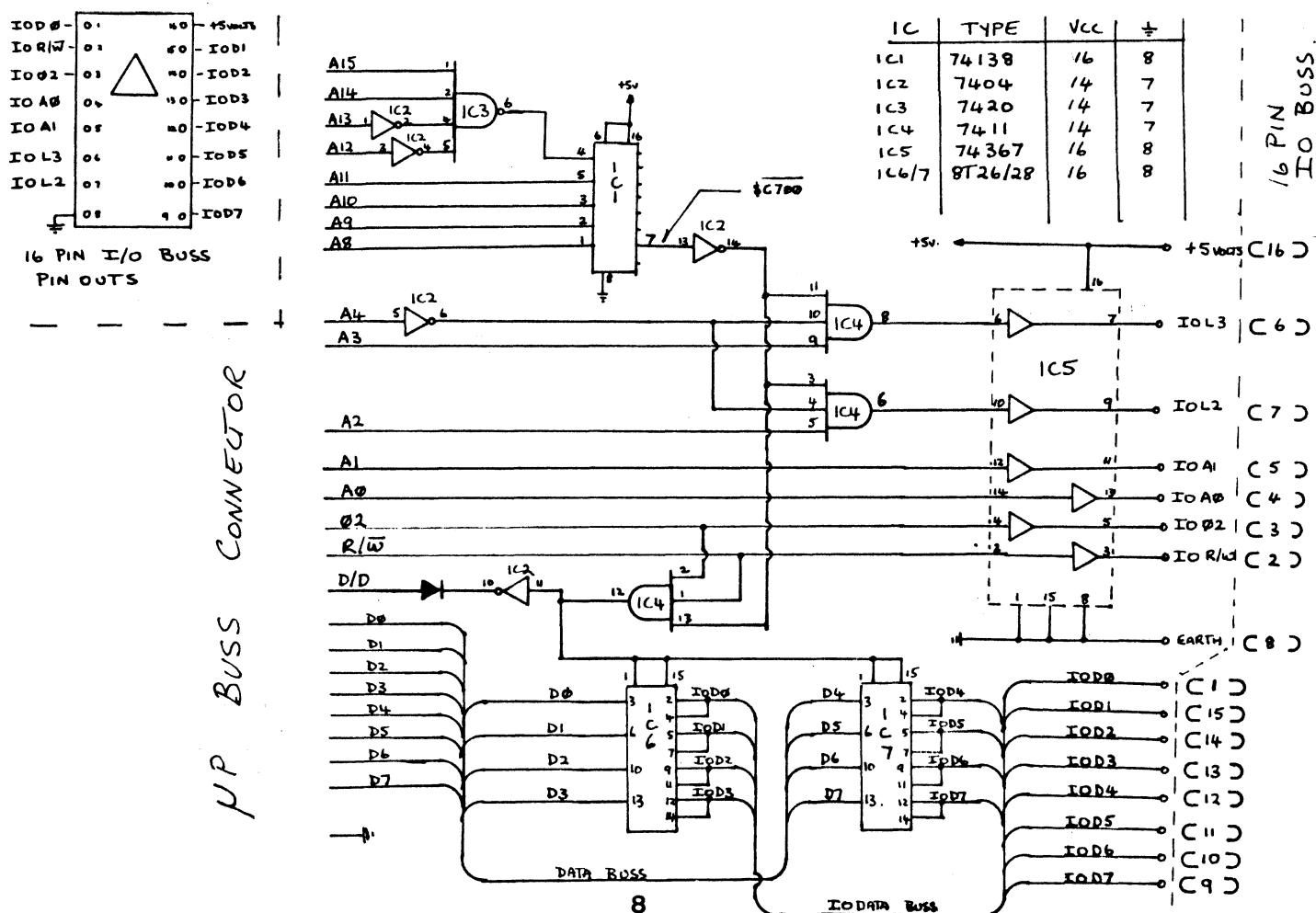
This buss can be implemented on a Superboard or any other computer and is a necessity if you play around with the I/O on your machine. I have developed quite a few circuits for the 16 pin I/O including the stand alone Hi-Res board, the 2716/2732/2764 EPROM programmer, a Vortrax board etc.

I have included a circuit of the adaptor board required to interface the 16 pin I/O buss to the Superboard. David Tasker is looking at doing the artwork for a board like this for the Tasker buss.

If you have the earlier 48 line Disk Controller board from David Tasker, you have a 16 pin I/O buss, however its connections are not correct as we did not have the correct connections when the original artwork was done.

Ohio supplies quite a few boards to plug into this buss including a 48 line I/O board, a Hi Speed D/A & A/D board which will do 66,000 samples per second, an EPROM programmer and a solderless prototype board.

Over the next couple of months I will give you some information on how to use this buss to add A/D converters, PIAs etc to your computer.



ADDING A V.D.U. TO YOUR SYM

Paul Webber

This article will hopefully provide some useful information to SYM owners who are contemplating adding a V.D.U. to their SYM. I have just finished my V.D.U. and I will discuss the problems I had and some ways to improve the system.

I have built the SCVT-100 serial terminal described in Electronics Australia, September, October, 1980. This unit can be bought in kit form from Applied Technology at the cost of \$194.50, this includes postage and insurance.

The next step was the keyboard, this took me a long time because there are so many keyboards available and the prices range from \$80 to \$500. The keyboard I obtained was a Clare keyboard, No. C70/MGP with caps lock modified. This is the keyboard that is recommended for the SCVT-100. The cost of the keyboard was \$198.00 and it was obtained from Daneva Australia Pty. Ltd., 66 Bay Road, Sandringham, Vic.

I bought a Tempest B/W T.V. from Homecrafts in Moorabbin which cost me \$89. This is cheaper than a monitor which would cost about \$150, and the modification is quite simple.

When I came to build the SCVT-100 I did have some problems, they had supplied the wrong I.C. with the kit and some wrong capacitors. These were replaced without much trouble and the time came to "power up", but the V.D.U. did nothing at all, much to my disappointment. The -12V regulator was going into thermal shut-down, this was caused by the UART chip No. AY-5-1013 which had an internal short on the -12V pin. A new chip was obtained and at last the terminal was going. The next thing to go wrong was the keyboard, it began to give false strobes which made the terminal print whatever garbage that was on the UART. I returned the keyboard and it was fixed for no cost.

The SCVT-100 has a "Typewriter Mode" switch and if this is left in the ON position the terminal will not communicate with the computer. To start the system all you have to do is enter a "Q" from the keyboard. I used the RS-232 to link the terminal and the computer. The terminal data book lists a maximum baud rate of 1200, I have discovered that this can be increased to 2400 baud by just continuing the binary count listed. The baud switch is S1 and the positions are: 1 ON, 2 OFF, 3 ON, 4 OFF. This setting will obtain a 2400 baud rate but the Pad Bit SA650 must be set to \$0F or it will miss lines on the carriage return, the baud rate SA650 is set by the SYM to \$06.

The keyboard cursor right is incorrect because the ASCII code is wrong and the terminal prints garbage on the screen. The keyboard can be made to auto repeat by adding a 15pf capacitor to C12.

I hope that the information that I have given is some use to SYM owners who have not yet added a V.D.U. Once you get a terminal going, you will notice the difference.

A PEACH, a DATAPHONE and the BEGINNING

by Brian Green

Having been a member of the Beginning since the beginning and having a PEACH with inbuilt terminal routines, I was very interested when the Dick Smith Dataphone was advertised. Being cautious by nature I waited a while before placing an order for a Dataphone, and was told the delay in delivery would be some six to eight weeks. Lo and behold, four days later a phone call informed me it had arrived.

After actually reading the instructions (hurriedly), I made up a 232 cable and plugged the unit into the Peach and the phone line. Frantically looked through all the papers lying around, till I found the instructions and password for the Beginning. Dialled up and got the tone ok, keyed in the term command and got I/O error. Damn. Tried again, I/O error and again and again and so on. Rang the Beginning hotline and it was unattended. Rang Computer Country and yes, the Peach was difficult to get on-line. Key in on one line basic program and then keep hitting the RUN key until you get on, was the answer, I was told. Away again through the process and still no result, so back to Dick Smith with the package. Ahh, I see you have trimmed the plug to fit a normal phone connection Sir, was the question. Well, I couldn't wait for Telecom now, could I? After all, technology waits for no-one. Well the plug wiring is different for the normal plug compared to the special modem connection, and there is some problem with signal strength. So be warned. While waiting for the plug, I read the instructions slowly, and what's this, TXD, I thought means transmit data out pin, but in the fine print was transmit data TO modem. The result is that for a Peach you need a pin to pin cable with no reversed pins as suggested by the instructions.

So all fixed up, dialled up again, got the tone, hit the switches, and was on and going. A few connections more under the belt with no equipment problems at all, so the Disk Smith Dataphone is ok by me.

THE BEGINNING: Well, I must say I am a little disappointed so far. Many of the options listed are not available and the entire process is dreadfully slow. An example; if you key in an error, you get an error code on screen. To find out the error code meaning, you have to go to the error help menu and look up the error code, find out what you did wrong, then get back to where you were. At 300 baud, and many screen writing stops for something, makes it a long process. The error codes are not in the instruction manual, so you have to write them down off screen. There are some 88 programs on line for the Peach, but you can't buy the loader program to download, as it isn't ready yet, and we are sorry but we can't supply the downloading protocols for you to write your own. Well, I have written a program to load ASCII files from the 232 port, would you be interested in looking at it? Sure, we'll be in touch. So maybe we Peach owners have some hope.

VOTES: Peach...Great. Dataphone...Great. Beginning...Still a long way to go, but getting there.

Available now from Brian Green, a program to download OSI BASIC files to PEACH, converts software to help our software base.
Write to Brian care of KAOS.

"CLS" CLEAR SCREEN FOR DISK SYSTEMS

Many popular "Basics" have a Clear Screen routine which can be put in a program by just entering CLS, eg. "Line 10 CLS". But not OSI Basic!

I was delighted to discover that Geoff Cohen (Omega Newsletter, October 1981) described a number of "extras", but the one that really hit the spot was "CLS". It's fantastic!

The trick he uses is to hook into Basic and make use of the space occupied by the keyword "LET" which is really redundant, anyway. He has replaced "LET" with CLS, together with the appropriate clear screen routine right into DISK BASIC, where it lives on forever(!) without being "visible" to the user. With due acknowledgement to Geoff, I have set out a listing below. Just type it in and "RUN", on all your disks. You'll be pleased you did! "LIST" any program, just to fill the screen, then type CLS in immediate mode and watch the "magic" screen clear.

```

10 REM  ++++ CLEAR SCREEN ROUTINE "CLS" ++++
12 REM
80 DISK!"CA 4200=04,1
140 REM          * CORRECT JUMPS TO FREE ALL CODE
150 POKE18342,14
160 POKE18502,24
210 REM          * CLEAR SCREEN ROUTINE
220 DATA72,138,72,152,72,169,32,160,0,162,8,153,0,208,200,208,250
230 DATA238,110,24,202,208,244,169,208,141,110,24,104,168,104
240 DATA170,104,96
250 AC=18529:FORI=0TO33:READD:POKEAC+I,D:NEXT
300 REM          * SAVE CORRECTED CODE
310 DISK!"SA 04,1=4200/8":REM * SA03,1=4800/8 for 8" disk
400 REM          * CHANGE SPACE 'LET' TO 'CLS'
410 DISK!"CA 4200=02,1"
420 POKE17054,67:REM * $029E='C'
430 POKE17055,76:REM * $029F='L'
440 POKE17056,211:REM * $02A0='S' (with bit 7 high)
480 DISK!"SA 02,1=4200/8"
500 END

```

Bill Roberts

THE MEETING WAS KAOS
by King Corky

We interrupt out serial for some mundane news items. A very quiet meeting this month, about 50 members and not too much noise, apart from the usual heckling rabble in the front row. We were treated to an interesting musical recital, (written in FORTH), by Ray Gardiner of the Shepparton chapter. Ray also had on display the new RABBLE 65 single-board system. This little gem has got to be the most cost effective computer to be developed by anyone. At around \$300.00 it comes fully built and tested with 16K CMOS RAM, floppy controller, video driver, ports, keyboard and WOW, DOUBLE WOW, GTBUG !!*!!! (in a modified form, more news of this later in our serial). From John Whitehead, to a request for comment on anything from D.J.A., was a firm No-Comment. You must be running out of prom space John, which could be the reason for no new developments. An offer for print buffers (32K, with page repeat facility), for \$170 plus p/p will expire Nov. 7. See G.L. Wragg. (maybe our secretary Rosemary knows who he is, I don't.) Our Mighty Guru, David Anear, announced the inclusion of Dabug to OS-65U, which beats the pants off the resident editor. It not only gives us the normal cursor control, but also the familiar single-key entry with 'open', 'close', and a few others, added. George Nikolaidis appears to have provided me with another subject for a SAGA. His new assembler, mentioned in the last month's issue, is having teething troubles. Stayed tuned.

And now we return to our serial...THE BUG...We left our hero? in a state of despair last month, but in the grandest hero tradition, he has been clutched from a fate worse than death in the nick of time. GTBUG will be included in the RABBLE 65 single-board computer in a standard 4K rom (at F400). Problems and complexities, which are now legend, have stripped THE BUG down a little, but without ever having seen it working, no-one would know the difference. It includes a large, (over 2K), trace routine. THE BUG will also be available for the Superboard if certain mods are done, but not to the standard S/B. Tony is also working on a 65U version, 65D is available now. The trace routine works for both machine code as well as BASIC programs. Until more info is glitched from T.D., we will leave Tony to his deliberations and let him enjoy a brief moment of glory until the next 'bug' shows itself.

The absolute addressing mode is one of two forms of memory addressing where the CPU obtains the address for the address bus directly from the instruction (ie from the byte(s) following the opcode). The second form applies only to the first 256 bytes of memory from \$0000 to \$00FF.

These locations which are known as page zero locations may be addressed using an instruction in which the CPU assumes an implied value of \$00 for the two most significant digits of the address. This form of addressing is not surprisingly known as PAGE ZERO mode.

Page zero instructions use only two bytes of memory instead of the three used by the absolute mode. They also process faster. This type of instruction is often used for 'quick access' storage of constants, variables and other information used in a program. The BASIC interpreter uses page zero mode extensively which is why so many POKES to change operating conditions in ROM systems are to locations 0 to 255.

Zero page addressing notation uses a two digit address after the mnemonic. Now if we wanted to address location \$00AB and store the value contained there in the accumulator we could use:

Absolute mode - LDA \$00AB

Page zero mode - LDA \$AB

Note though the difference between this latter instruction and the immediate mode - LDA #\$AB covered in previous articles.

-o-0-o-

Many of the addressing modes of the 6502 use what is known as indexed addressing. All of the indexed mode instructions use one of the index registers as an 'offset' to a base address. In this way any one of 256 (base address to base address plus 255) locations can be accessed by each instruction.

The simplest forms of indexed addressing are extensions of the absolute and zero page addressing modes. They are known as ABSOLUTE INDEXED and ZERO PAGE INDEXED. In these two modes the contents of the specified index register is added to the address following the opcode. The value obtained from this addition is what is put on the address bus.

For example LDA from \$1000 using Y as an offset in absolute indexed mode would be equivalent to the BASIC expression A=PEEK(4096+Y). Indexed mode notation adds a comma and the name of the register to be used after the address. The LDA in the example would be shown as LDA \$1000,Y

A STA in Zero page indexed mode would be shown as STA \$AB,X

Note: There are only two instructions which use the Y register in page zero mode. The two registers cannot therefore be regarded as interchangeable in this mode.

An absolute indexed instruction inside a loop can be used to perform the same operation on a block of memory without the inherent dangers and problems of self modifying code.

For example a program to clear a 2K byte screen in absolute indexed mode

```
INIT   LDA #$20
        LDY #$00
TVPUT  STA $D000,Y
        STA $D100,Y
        STA $D200,Y
        STA $D300,Y
        STA $D400,Y
        STA $D500,Y
        STA $D600,Y
        STA $D700,Y
        INY
        ENDTST BNE TVPUT
```

On each pass through the program 7 screen locations will be cleared. While this version of the screen clear is a little longer than the absolute mode version it has the advantage that it is ROMable, ie. it will run in ROM.

-o-0-o-

Probably one of the most powerful of the addressing modes of the 6502 is INDEXED INDIRECT or POST INDEXED INDIRECT. Indexed indirect instructions have the following features:

- (a) instructions are all two byte instructions
- (b) The byte following the opcode specifies an address on page zero. This location contains the low order half of a 16 bit address. The other half is in the next location. The CPU obtains the base address INDIRECTly by reading the address from the specified page zero locations.
- (c) The Y register is always the offset register in this mode. The operation LDA in this mode could be represented in BASIC as
A=PEEK(PEEK(32)+256*PEEK(33)+Y)
Similarly STA would be
POKE(PEEK(32)+256*PEEK(33)+Y),A

The indirect indexed mode is distinguished from page zero indexed mode by the use of brackets to enclose the two digit address. The brackets are intended to convey the impression 'contents of'. Following the right bracket the index mode notation ,Y indicates 'post' indexing. Thus the instructions in BASIC above would be written as

```
        LDA ($20),Y
        and STA ($20),Y
```

In a program, if \$20 contained \$00 and \$21 had \$D0 then STA (\$20),Y would store the accumulator somewhere (depending on the value of the Y register) on the first page (256 bytes) of screen memory on an OSI machine.

There are a lot of things going for indexed indirect mode. It has flexibility (you can change both the effective address and the base address without altering the instruction) it avoids the pitfalls associated with self modifying code and it will run from ROM as well.

As an exercise see if you can construct a screen clear using indirect indexed mode. (hint: use ideas from the previous examples)

FORTH

If you are ordering FORTH on cassette from Ritchie Laird, would you please send a C60 tape with about 30 seconds of your computer tone recorded on one side. Do this by putting the cassette player on record and entering SAVE on the computer. This will allow Ritchie to set up his recorder to match your's and ensure that the tape will load properly on your machine.

DEAR PAUL

Your Questions Answered by Paul Dodd (Our Resident Expert?)

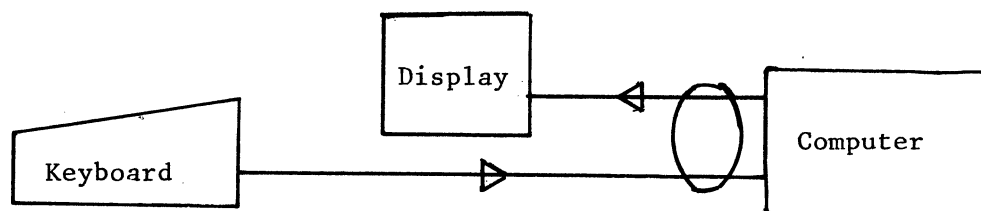
Hello again and welcome to another chapter (page) in the history of KAOS. Today I will answer your questions and solve all your problems? on serial data transmissions!!

Q. What does ACIA mean and what does the one in my Superboard do?

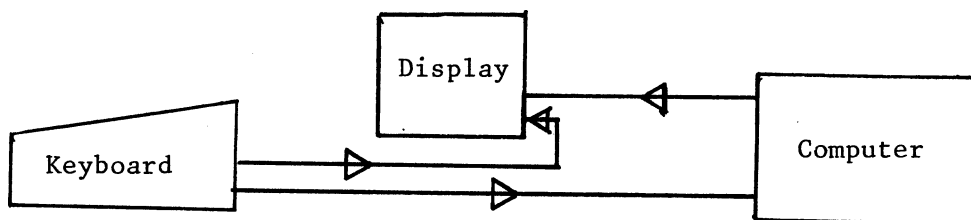
A. ACIA means Asynchronous Communications Interface Adapter and it converts parallel data from the data bus to serial data for transmitting to your cassette player, RS232 port or modem etc.

Q. What is the difference between full and half duplex?

A. The easiest way to describe these is with a diagram:



FULL DUPLEX



HALF DUPLEX

With full duplex all communication is conducted via the computer but with half duplex the keyboard "talks" to both the display and the computer. The advantage of full duplex is that the computer has to send your data back again which makes error checking simple. The advantage of half duplex is that data only needs to be transmitted once in only one direction.

Q. What is RS232?

A. RS232 is a serial data transmission standard used for data communications over long distances.

```
5 REM HEX/DECIMAL/HEX CONVERTER ::::: JOHN WHITEHEAD
10 PRINTCHR$(127)"Hex to Dec = H    Dec to Hex = D ";
20 INPUTA$:IFA$="H"THEN90
30 INPUT"Dec=";T:E=T/4096:D=INT(E):F=(E-D)*16:IFT)65535THENRUN
40 C=INT(F):G=(F-C)*16:B=INT(G):A=INT((G-B)*16+.5):IFA)9THENA=A+7
50 IFB)9THENB=B+7
60 IFC)9THENC=C+7
70 IFD)9THEND=D+7
80 PRINT" $"CHR$(D+48)CHR$(C+48)CHR$(B+48)CHR$(A+48):GOTO30
90 INPUT"Hex = ";H$:N=0:H=1:FORX=1TOLEN(H$):D=ASC(RIGHT$(H$,X))-48
100 IFD)22THENRUN
110 D=D+7*(D)9):N=N+D:H=H*16:NEXT:PRINTN:GOTO90
```

OK

MODS I HAVE DONE TO MY C2-4P
by Wayne Geary

I have carried out a number of modifications to my OSI C2-4P. Some of these mods may be of use to other OSI owners and reading through your back issues, it would appear that some people may have already made similar mods. I have listed the mods which I feel may be of interest to others. Those who are interested could write to me for details.

1. VIDEO BOARD EFFECTS

Use the 4 bit colour control memory to achieve

- a) Reverse Graphics
 - b) Flashing characters - this works for normal and reverse and does not just alternate between the two modes.
 - c) Expanded character set - using 2732 or 2764 EPROMs. Actual details of character sets are not available as yet.
- These mods should(?) be suitable for C4 owners who do not use the colour facility as I believe vide boards are the same.

2. CPU BOARD ROM EXPANSION

Modify CPU board to accept 4 X 2732 EPROMs to give 16K in the range \$8000 to \$BFFF. My 16K block has:

- a) OSI Assembler/Editor - down load to use
- b) OSI Extended monitor - runs in ROM with compare statement instead of 8 byte dump.
- c) 8K BASIC - modified
- d) PRINT AT routine for 8K BASIC - Dabug III also required mods for this routine for single key entry and screen clear routines to work as WARM START is now \$9202 not \$A274.
- c) 1.25K spare ROM for future routines.

These mods would operate on C2 and C4 machines. The theory should also be of assistance to Superboard/C1 users who wish to attempt similar mods.

3. GAMES PROGRAM

I am presently carrying out final checking on a game called "TAIPAN" which makes use of the video effects and PRINT AT routine and occupies 14K. Listing is 7 pages! Video effects could be dispensed with and retain good graphics although dispensing with PRINT AT and poking strings would use a lot of memory. The game is based on TRS80 version with trading in various cargos between 8 ports. The game is adventure style with graphics and does not use scrolling at any time. Some sound effects are also included.

To help cover costs of postage, etc., it would be appreciated if people could forward \$1 for one item or \$2 for two or more when asking for details. I can supply a copy of 'TAIPAN' on cassette for an extra \$4, or you can supply your own C46 or C60 cassette.

As a side point, the PRINT AT routine is based on the version from MICRO No49 for June 1982. PRINT AT can also clear a full screen almost as quick as machine code routine accessed by USR command and without scrolling of the screen. I use it to clear a half screen regularly in TAIPAN. PRINT AT is faster than poking individual characters to the screen by several magnitudes.

NASHUA BRISBANE offer the following deals on diskettes :-

MD-1D SSDD 5.25"	disks at \$45.00 per box inc. tax
MD-2D DSDD 5.25"	" " \$50.40 " " " "
FD-1D SSDD 8"	" " \$51.00 " " " "

Contact Roger Harcourt,

for a full

price list. All disks come in plastic library cases.

PEACH DISK COPY ROUTINE
FOR 40K DISK BASIC MA-5301
by Brian Green

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
7000	8E	70	65	BD	B1	04	BD	E8	04	86	FF	B7	92	E2	B6	92
7010	E2	4C	81	28	27	1A	B7	92	E2	8E	50	00	EF	92	DC	7F
7020	92	DE	C6	02	F7	92	DF	C6	FF	F7	92	E0	8D	0B	20	20
7030	8E	70	AE	BD	E1	04	7E	EF	0E	F6	92	E0	5C	C1	10	27
7040	0E	F7	92	E0	BD	95	08	C6	80	3A	BF	92	DC	20	EA	39
7050	8E	50	00	EF	92	DC	7C	92	DE	C6	FF	F7	92	E0	7C	92
7060	DF	BD	70	39	20	AB	0D	0A	0D	0A	50	75	74	20	6D	61
7070	73	74	65	72	20	64	69	73	63	20	69	6E	20	64	72	69
7080	76	65	20	30	2E	20	43	6F	70	69	20	64	69	73	6B	20
7090	69	6E	20	64	72	69	76	65	20	31	2E	54	68	65	6E	20
70A0	70	72	65	73	73	20	61	6E	79	20	6B	65	79	2E	00	0D
70B0	0A	0D	0A	43	6F	70	69	20	63	6F	6D	70	6C	65	74	65
70C0	2E	00	00	00	00											

Any queries, contact me on

EXTENDED MONITOR (Cassette Version)
by John Whitehead

I have altered the BASIC disassembler so that it will disassemble a machine code program and give it labels in a form that the Assembler/Editor will except. I have also disassembled the Extended Monitor and reassembled it. Doing this has given me room to improve some commands. Some of the improvements are mine and others are from Peek(65).

The mods are :-

Compatability with BASIC. The U key returns you to BASIC.

The save routine gives an 'ERROR' message if the ';' is missing, the checksum does not add up or the character is not 0 to F. The screen does not scroll on an error.

The '@' routine does not need 'Line Feed' to be pressed when changing consecutive locations. Also keyboard characters can be put into memory without having to look up the ASCII code. By holding down 'Shift 2', characters in consecutive locations can be seen.

The search routines have been altered to show repeated occurrences as per KAOS April 82.

The program is available on, tape at \$1800 to \$1FFF, from me at the normal club price of \$3.00 and the manual for \$2.00 or in EPROM for \$10 at \$X800 where X = 0 to 9 or E. For EPROM I need to know your lines / screen for the 'Q' command.

This and the original version can be relocated using the R command if after relocation the address table from \$0960 to \$0999 is changed to the new address. E.G. If relocating to \$E800, change at \$E961 from \$0B to \$EB, at \$E963 from \$0B to \$EB, at \$E965 from \$0C to \$EC etc.

FOR SALE

SUPERBOARD (series 2) in METAL CASE with WOODEN SIDES,
8K RAM, DABUG and POWER SUPPLY, \$400.00 O.N.O.
Phone Peter Collins